

13. A touch-sensitive manually operable controller for providing positive and negative control signals relative to three axes, the controller having six sensors mounted on its outer surface, two sensors mounted on opposing sides of the controller relative to each axis of a Cartesian coordinate system, the six sensors including:

- a first sensor mounted along the negative X-axis for providing a positive X-axis control signal in response to pressure;
- a second sensor mounted along the positive X-axis for providing a negative X-axis control signal in response to pressure;
- a third sensor mounted along the negative Y-axis for providing a positive Y-axis control signal in response to pressure;
- a fourth sensor mounted along the positive Y-axis for providing a negative Y-axis control signal in response to pressure;
- a fifth sensor mounted along the negative Z-axis for providing a positive Z-axis control signal in response to pressure; and
- a sixth sensor mounted along the positive Z-axis for providing a negative Z-axis control signal in response to pressure, the touch-sensitive manually operable controller further comprising:
 - a plurality of touch-sensitive manually operable sensors mounted about the positive x-axis,
 - a plurality of touch-sensitive manually operable sensors mounted about the negative x-axis,
 - a plurality of touch-sensitive manually operable sensors mounted about the positive y-axis,
 - a plurality of touch-sensitive manually operable sensors mounted about the negative y-axis,
 - a plurality of touch-sensitive manually operable sensors mounted about the positive z-axis, and
 - a plurality of touch-sensitive manually operable sensors mounted about the negative z-axis,

x-rotation means for providing an X-rotation signal in response to forces applied to those sensors mounted about the Y and Z axes which are aligned generally such that a force applied normal to their surface would produce a torque about the X-axis,

Y-rotation means for providing a Y-rotation signal in response to forces applied to those sensors mounted about the X and Z axes which are aligned generally such that a force applied normal to their surface would produce a torque about the Y-axis, and

Z-rotation means for providing a Z-rotation signal in response to forces applied to those sensors mounted about the X and Y axes which are aligned generally such that a force applied normal to their surface would produce a torque about the Z-axis.

14. A touch-sensitive manually operable crane controller comprising first and second force-sensitive matrix sensors mounted on opposing sides of the controller, each sensor for providing two control signals in response to the position of a force applied to that sensor, and each further providing a signal responsive to the magnitude of the force applied to that sensor, the force signals for providing signals controlling the rotation of a crane element in a clockwise or counterclockwise direction, movement of a force away from and towards the operator on the first sensor for providing a signal controlling the position of a crane boom-end extension, movement of a force away from and towards the operator on the second sensor for providing a signal controlling the position of a crane outrigger, movement of a force up or down on the first sensor for providing a signal controlling the position of a crane element in a vertical direction, and movement of a force up or down on the second sensor for providing a signal controlling the hook cable.

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